Lesson Overview:

Students will identify and learn about intertidal species while playing a fun, interactive game similar to '20 Questions'. With a species photo pinned/taped to their back, students ask questions and request clues from their classmates in an attempt to identify their mystery tidepool organism.

Subjects:
Biology, Critical Thinking

Preparation:
Consider introducing the species or leading a class discussion about the biological and ecological traits of species listed before doing the activity.

Materials:
Copies of the Intertidal Animal Scramble activity sheets, ideally on card stock or laminated; safety pins or tape

Time:
15-30 minutes

References:
Developed by resource educator Chelsea Rider, the lesson combines activities (*Wild Animal Scramble* and *Animal Clue Game*) from Sharing Nature with Children by Joseph Cornell.

State of Oregon - Education Standards
6.2L.2 Interaction and Change

Ocean Literacy Standards
5a Some Major groups are found exclusively in the ocean.

5d Ocean biology provides many unique examples of life cycles, adaptations and important relationships among organisms that do not occur on land.

Intertidal Animal Scramble

1. Print out enough copies of the Intertidal Animal Scramble activity sheets, one animal for each student. Depending on your class size, you might need duplicates of each animal (14 species total).
2. Model the activity by asking a student to select and place an *Intertidal Scramble Card* on your back. Explain that you will be asking questions that may be answered by the students as "Yes, No, or Maybe." Begin asking questions to try and guess what intertidal species you represent, for example: *Am I an invertebrate? Am I found in the high tide zone? Do I have appendages?* After a few questions, ask the students to help you by reading the first clue on the card to you, using this information to help you guess. Ask a few more questions and request clue #2. Continue in this manner until you are able to either guess or give up.
3. Ask students to turn their backs from you and not look while you secure an *Intertidal Scramble Card* to each of the student's backs. Make sure that each student is unable to see his or her own creature.
4. Tell the students that they must now discover the secret identity of the animal on their back. Following the instructions in step 2, students will try to guess their assigned species by wandering around the room asking other students questions and clues. They may only ask one question/receive a clue from a specific student. They must move on and find another person to query.
5. Once students discover their assigned species, have them place the card on the front of their body, and continue helping others.

Extensions:

- Introduce tide pool species by completing the *Discovering the Intertidal* activity, then us this as an evaluation activity as students must be familiar with species in order to follow clues and correctly guess.
- Assign students to research and report on specific species.
- Choose students to individually model *Intertidal Scramble Cards* as described, step #2.

Intertidal Animal Scramble

Giant Green Anemone

Anthopleura xanthogramica

1. I am related to sea jellies.
2. I don't have any sort of shell at all to protect me.
3. I stick to the rocks, and won't move much over the course of my lifetime.
4. I eat whatever comes my way: mussels, barnacles, small fish, and crabs.
5. I can only feed when the tide is in and I am submerged.
6. I don't like being exposed to too much sun, so when the tide is out, you may see me coated in small rocks and bits of shell; I am using them as camouflage and sunscreen.
7. I am a broadcast spawner.
8. My tentacles have more sticky cells than stinging cells.
9. My skin is green because of small, single-celled plant-like organisms that live in it. They soak up the sun and make extra energy for me to use. In return I offer them protection from predators.

Intertidal Animal Scramble

Aggregating Anemone

Anthopleura elegantisima

1. I am related to sea jellies.
2. I don't have a shell to protect my soft body.
3. I grow in large colonies of genetically identical "brothers" or "sisters." When two different colonies meet, they will fight for territory.
4. I can reproduce two ways: sexually and asexually.
5. When I reproduce asexually, the process is called binary fission.
6. I will eat most anything that comes my way, as long as it is small enough. I love to eat small crabs and fish, but will happily dine on micro-invertebrates like zooplankton.
7. My genetically identical relatives may be living in the same spot thousands of years from now which leads scientists to wonder whether or not I should be considered an immortal life form.

Intertidal Animal Scramble

Ochre Sea Star

Pisaster ochraceus

1. I am related to the sea urchin and the sand dollar.
2. My “skin” is both spiny and spongy.
3. I am a major intertidal predator.
4. I love to eat mussels, and in the intertidal zone I keep their population in check.
5. I come in many different colors, ranging from red to orange and purple.
6. I am a broadcast spawner.
7. I can survive for more than a day out of the water, but I am happiest when I am submerged.
8. I am not too fond of the sun; I can often be found in cool, shady crevices in the rock.
9. I move quickly for an intertidal animal, although you may not notice the difference; life tends to move pretty slowly in the tide pools.
10. It may look like I have five legs, but I get around using my thousands of tiny tube feet.

Intertidal Animal Scramble

Sunflower Sea Star

Pychnopodia helianthoides

1. I am related to sea urchins and sand dollars.
2. My “skin” is velvety soft with hard little bumps imbedded in it.
3. I can be purple, pink, red, blue, yellow, or brown. Sometimes I am many colors.
4. I am a fierce intertidal predator; nothing can stand up to me.
5. I can move more than a meter in a minute; I am one of the only intertidal animals that you can watch moving along the ocean floor.
6. I love to eat sea urchins.
7. I have 16-24 arms called rays.
8. I can be up to one meter across, that’s longer than the length of your arm.

Intertidal Animal Scramble

Sea Lemon

Archidoris montereyensis

1. I am distantly related to octopuses, mussels, and snails.
2. I have no shell to protect my soft body.
3. I love to dine on sea sponges, like breadcrumb sponge and purple encrusting sponge.
4. I get around by smelling my way, using the two smelling projections on my head.
5. I have a soft little plume of gills that I breathe with; they are attached to my back.
6. When I lay eggs, they look like a thin yellowish ribbon curled into a rose shape.
7. Some people think I smell fruity.
8. I am yellow, about the size of your fist, and bumpy.

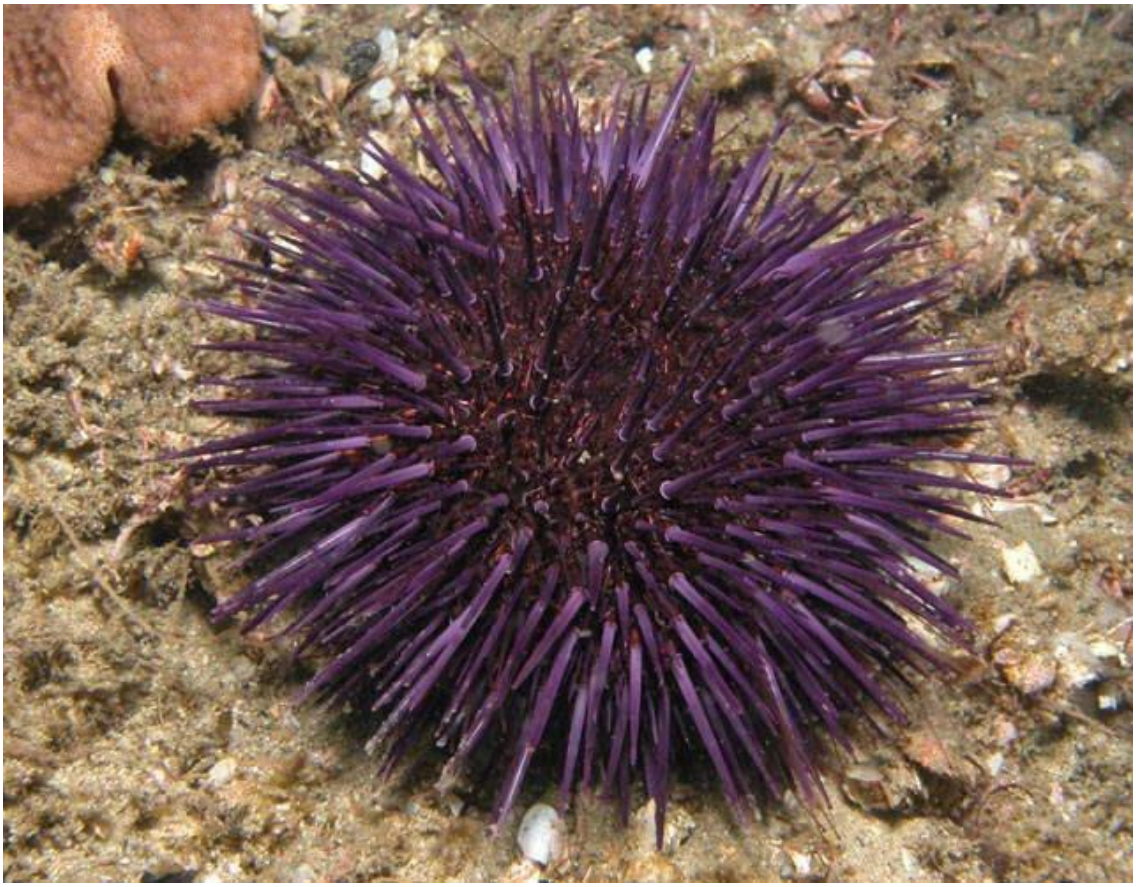
Intertidal Animal Scramble

Giant Pacific Chiton or Gumboot Chiton

Cryptochiton stellerii

1. I am distantly related to snails, octopuses, and slugs.
2. I am a very old kind of animal. Creatures just like me have been around for about 400 million years.
3. I have eight interlocking plates that form a type of protective skeleton within my back.
4. I get around using a large muscular “foot” on the underside of my body, just like a slug does.
5. I have soft, brightly colored skin that covers my protective plates. This skin is called a mantle.
6. I am an herbivore; my favorite food is encrusting algae.
7. I am nocturnal; since I don’t like the sun very much, you will most likely find me hiding under rocks or ledges during the day.
8. I can be up to 14 inches long and weigh more than 4 pounds.
9. Some people think I look like a flattened football, others think I look like a cow’s tongue.

Intertidal Animal Scramble



Purple Sea Urchin

Strongylocentrotus purpuratus

1. I am related to sand dollars and sea stars.
2. I have tube feet that reach out through holes in my shell and help me to feed.
3. I can live up to 70 years.
4. I am an herbivore, and I love to eat iridescent algae.
5. My “mouth” is on the underside of my body and has a funny name: Aristotle’s lantern.
6. The shell that I leave behind when I die is called a test.
7. I am most common in areas with a lot of exposed rock, as that is where I make my home. I am not well adapted for the sand.
8. I may look sharp and spiny, but I won’t pierce your skin with my spines, they are too dull on the ends. I use them for protection from predators.

Intertidal Animal Scramble

Acorn Barnacle

Balanus glandula

1. I am related to dragonflies, crabs, and spiders, although you wouldn't know it by looking at me.
2. After my larval stage, I become attached permanently to a hard surface; there I will spend the rest of my life.
3. Once I am planted on a hard surface I will begin building my shell; it is shaped like a volcano.
4. I am a marine animal, but I am pretty comfortable spending time above the water. I usually live in the high tide zone.
5. I have a trap door in my shell that I can close to protect me from drying out in the sun.
6. I am a filter feeder; this means I dine by sweeping plankton out of the water when the tide is in.
7. I will spend most of my life with my head glued to a hard surface, and my feet pointing upward, out of my shell.

Intertidal Animal Scramble

Gooseneck Barnacle

Pollicipes polymerus

1. I am related to spiders, ants, butterflies, and scorpions, believe it or not.
2. I am a filter feeder.
3. I prefer to be wet, but I can last for a few days without much water. That's why I live in the high tide zone.
4. Sometimes I live in mussel beds.
5. I sweep the water with my "legs" to catch debris when the tide is in.
6. Once I settle from my larval stage, I'm stuck for the rest of my life.
7. We form dense colonies in crevices on rocky shores with strong waves.

Intertidal Animal Scramble

Black Turban Snail

Tegula funebralis

1. I am related to land snails and slugs.
2. I love to eat seaweed and algae that I find in the pools.
3. My favorite kinds of algae to eat are soft algae like sea lettuce and laver.
4. Carnivorous snails like whelks will sometimes prey upon me.
5. I am found both in the tide pools and at mid-tide.
6. My shell is the perfect hideout for a hermit crab.
7. I have been known to live up to 100 years. This may explain why my "black" shell is more frequently blue, purple, or white; it has been partly washed away by the years I have spent in the tide pools.
8. My curly, round shell reminds some people of a hat called a turban.

Intertidal Animal Scramble

Hermit Crab

Pagurus spp.

1. As an arthropod, I am related to barnacles and dragonflies.
2. I love to eat almost anything I can get my claws on, from algae to meat and fish. In captivity, I love to eat fruit.
3. I have ten legs.
4. When I am scared, I can retract my body completely into “my” shell.
5. “My” shell is actually a borrowed shell left behind by a sea snail. I can only move in if the shell was left intact.
6. My soft abdomen is specially adapted to fit snuggly into my new shell.
7. I will slowly outgrow my home as I age; when I do, I will go in search of a new one.

Intertidal Animal Scramble

California Mussel

Mytillus californianus

1. I am related to clams and cockles.
2. I support the intertidal community by providing food and habitat for many different creatures.
3. I am a bivalve.
4. I live in large colonies called beds.
5. Other organisms often live in my beds, including acorn barnacles, gooseneck barnacles, many species of algae, and aggregating anemones.
6. My shell can be up to 10 cm in length.
7. Gulls, sea stars, oystercatchers, and surf scoters love to eat me.
8. Ochre sea stars keep my population in check within the tide pool community.

Intertidal Animal Scramble

Whelk Snail

Nucella emarginata

1. I am related to land snails and slugs.
2. I am a carnivore, but sometimes I prefer to scavenge my meals.
3. Using my raspy tongue (radula), I can bore through the shells of my prey items and lick out the tasty insides.
4. It sometimes takes me two days to bore through the shell of my prey and eat them.
5. I like to eat barnacles, hermit crabs, snails, and decaying matter.
6. There are many types of creatures just like me that carry my name, including channeled dogwinkles and boreal wentletraps.
7. My shell is spiral shaped and pointy.